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REDESCRIPTION OF *EUTARSOPOLIPUS DESANI* COOREMAN AND DESCRIPTION OF *E. MIRIFICI*, N. SP. (ACARI: PODAPOLIPIDAE) FROM *CHLAENIUS* SPP. (COLEOPTERA: CARABIDAE) FROM CENTRAL AFRICA

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Abstract.—*Eutarsopolipus desani* Cooreman 1952, is redescribed from the types and measurements collected from the type host, *Chlaenius platynoides* Allaud, from near the type locality in the eastern region of the Democratic Republic of the Congo. The male stage of *E. desani* is described for the first time. ***Eutarsopolipus mirifici*, n. sp.**, is described from *Chlaenius mirificus* Pomeroy (Carabidae) from Entebbe, Uganda.

Key Words: *Eutarsopolipus desani, E. mirifici* n. sp., Acari, Central Africa, carabid

Mites in the family Podapolipidae (Acari: Tarsonemini) are highly specialized ecto- and endoparasites of insects of the orders Blatteria, Orthoptera, Heteroptera, Hymenoptera and especially Coleoptera. The genus *Eutarsopolipus* is restricted to carabid beetles world wide. Regenfuss (1968) established the *desani* group of *Eutarsopolipus* for *E. desani* Cooreman 1952, based on characters of the adult female. The type host, *Chlaenius platynoides* Allaud, is from Bukavu (Costermansville), Belgian Congo collected in January 1952. Reexamination of larval and adult female types and new collections of *E. desani,* and a new species from Central African *Chlaenius* spp. yielded data for a reevaluation of Central African *Eutarsopolipus.* It is the purpose of this paper to provide characters which are missing from the synapomorphic analysis by Regenfuss (1968), redescribe larval and adult female *E. desani,* describe the male stage of *E. desani,* and describe *E. mirifici,* n. sp.

MATERIALS AND METHODS

Males, larval, and adult females of *Eutarsopolipus desani* were collected from central African *Chlaenius platynoides* Allaud borrowed from the Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium, and the Musée Royal de l'Afrique Centrale, Tervuren, Belgium. Examination of additional central African carbids borrowed from The Natural History Museum, London, U.K., yielded *E. mirifici,* n. sp. from *Chlaenius mirificus* from Uganda. The technique for removing mites from museum specimens is described in Husband and Dastych (1998).

Measurements were taken with the aid of a Zeiss compound microscope with an ocular micrometer. All measurements are in micrometers. Setae that are no longer than setal sockets are listed as microsetae (m). The terminology used here follows that of Lindquist (1986). Often long setae are obscured, bent, broken or at an angle which makes measurement difficult. Setae are at least as long as indicated.

Family Podapolipidae Ewing 1922
Genus *Eutarsopolipus* Berlese 1913
Eutarsopolipus desani Cooreman 1952
(Figs. 1–3)

Literature.—*Eutarsopolipus desani* Cooreman 1952: Naudo (1967), Regenfuss

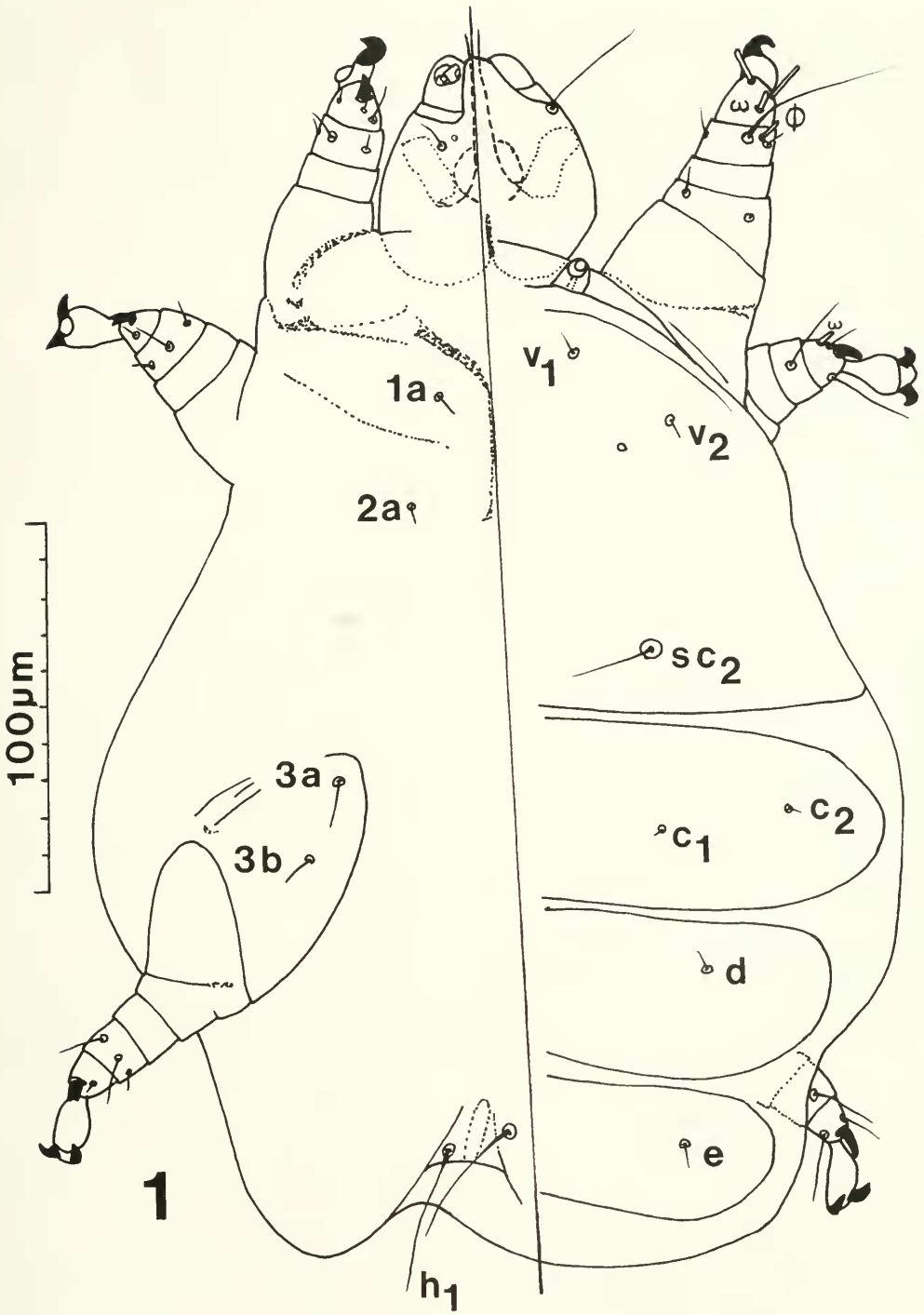

Fig. 1. *Eutarsopolipus desani* adult female, ventral (left) and dorsal aspects.

(1968, 1974), Husband (1986, 1995, 1998a, 1998b), Husband and Dastych (1998).

Type locality.—Bukavu, the Democratic Republic of the Congo (formerly, Costermansville, Belgian Congo) from *Chlaenius platynoides* Allaud (Carabidae).

Diagnosis.—Regenfuss (1968) separated *E. desani* from 17 other *Eutarsopolipus* primarily based on fused tibiotarsus I as stated by Cooreman. Reexamination of type and other specimens revealed that tibia and tarsus I are not fused. Cheliceral stylets of female *E. desani* are at least 60 micrometers long. Twisting of stylets makes measurement difficult. Stigmata and tarsus II solenidion ω are evident. Ambulacra I, II, III have strong claws. Lateral idiosomal bulges which are common in the *myzus* group are lacking in the *desani* group (Regenfuss 1968). Males have genital capsules which are slightly longer than wide and have straight lateral margins.

Female (Fig. 1).—*Gnathosoma:* Length 54–60, width 53–55. Palp length 18; cheliceral stylet length 60, pharynx width 17–19, dorsal gnathosomal setae 21–25, ventral setae 7–10, distance between ventral setae 22–23. Stigmata and trachea conspicuous.

Idiosoma: Length 378–437, width 330–370. Setae v_1 7–8, v_2 7–8, sc_2 19–22. Distance between setae v_1 43, v_2 lateral to a line connecting v_1 and sc_2. Setae c_1 7–8, setae c_2 7–8, setae *d* 7–8. Plate EF length 42–55, width about 125–130; setae *f* 10–11. Setae h_1 38–40.

Venter: Apodemes 1 moderately developed, meeting sternal apodeme medially; apodemes 2 not extending to sternal apodeme. Coxal setae 1*a* 5–7, 2*a* 5, 3*a* 8–12, 3*b* 8.

Legs: Leg setation as in Table 1. Ambulacra I, II, III with well developed claws. Tarsus I solenidion ω 5–6. Tibia I solenidion ϕ 7–9, famulus *k* 3–5. Tibiae I, II, III setae *d* 36–40, 13–15, 16–18 respectively.

Male (Fig. 2).—Gnathosoma length 32–40, width 35–38. Palp length 8–10; cheliceral stylet length 30–33, pharynx width 8–10, dorsal gnathosomal setae 7–10, ventral setae 2–3, distance between ventral setae 13–14.

Table 1. Leg setation for femora, genua, tibiae and tarsi for selected species in the *ochoai, myzus* and *desani* groups of *Eutarsopolipus* based on Regenfuss (1968) and Husband (1995).

	Leg I				Leg II				Leg III			
	F	G	Ti	Ta	F	G	Ti	Ta	F	G	Ti	Ta
E. ochoai	3	2	7	10	0	1	4	8	0	1	4	7
E. myzus	2	0	7	8	0	0	4	6	0	0	4	5
E. mirifici	2	0	7	8	0	0	4	6	0	0	4	5
E. desani	2	0	7	8	0	0	4	6	0	0	4	5

Idiosoma: Length 180–200, width 130–142. Setae v_1 2–3, v_2 2–3; sc_2 30–40. Distance between setae v_1 31–35, v_2 lateral to a line connecting v_1 and sc_2. Setae c_1 3–5, c_2 4–5, *d* 3–5. Plate EF length 23–30, width 45–55, setae *f* 4. Genital capsule posterior, longer than wide, with straight lateral margins, length 23–34, width 19–23.

Venter: Apodemes 1 moderately developed, meeting sternal apodeme medially; apodemes 2 extending to sternal apodeme. Coxal setae 1*a* m, 2*a* m, 3*a* 4, 3*b* 3.

Legs: Ambulacrum I with a single moderately developed claw. Ambulacra II, III with weak claws. Tarsus I solenidion ω 3–5. Tibia I solenidion ϕ 4–5, famulus *k* 2–3. Tibiae I, II, III setae *d* 26, 4–5, 4–5 respectively.

Larval female (Fig. 3).—*Gnathosoma:* Length 30–38, width 32–44. Palp length 14–16; cheliceral stylet length 38–40, pharynx width 9–10, dorsal gnathosomal setae 18–21, ventral setae 3–9, distance between ventral setae 12–14.

Idiosoma: Length 173–270, width 120–208. Setae v_1, v_2 5–6, sc_2 100. Distance between setae v_1 19–27, v_2 lateral to a line connecting v_1 and sc_2. Setae c_1 4–7, setae c_2 5–6, setae *d* 5–8. Plate EF length 26–40, width 33–65; setae *f* 8–9. Plate H length 15–24, width 12–22; setae h_1 115–128, setae h_2 34–39.

Venter: Apodemes 1 moderately developed, meeting sternal apodeme medially; apodemes 2 extending nearly to sternal apo-

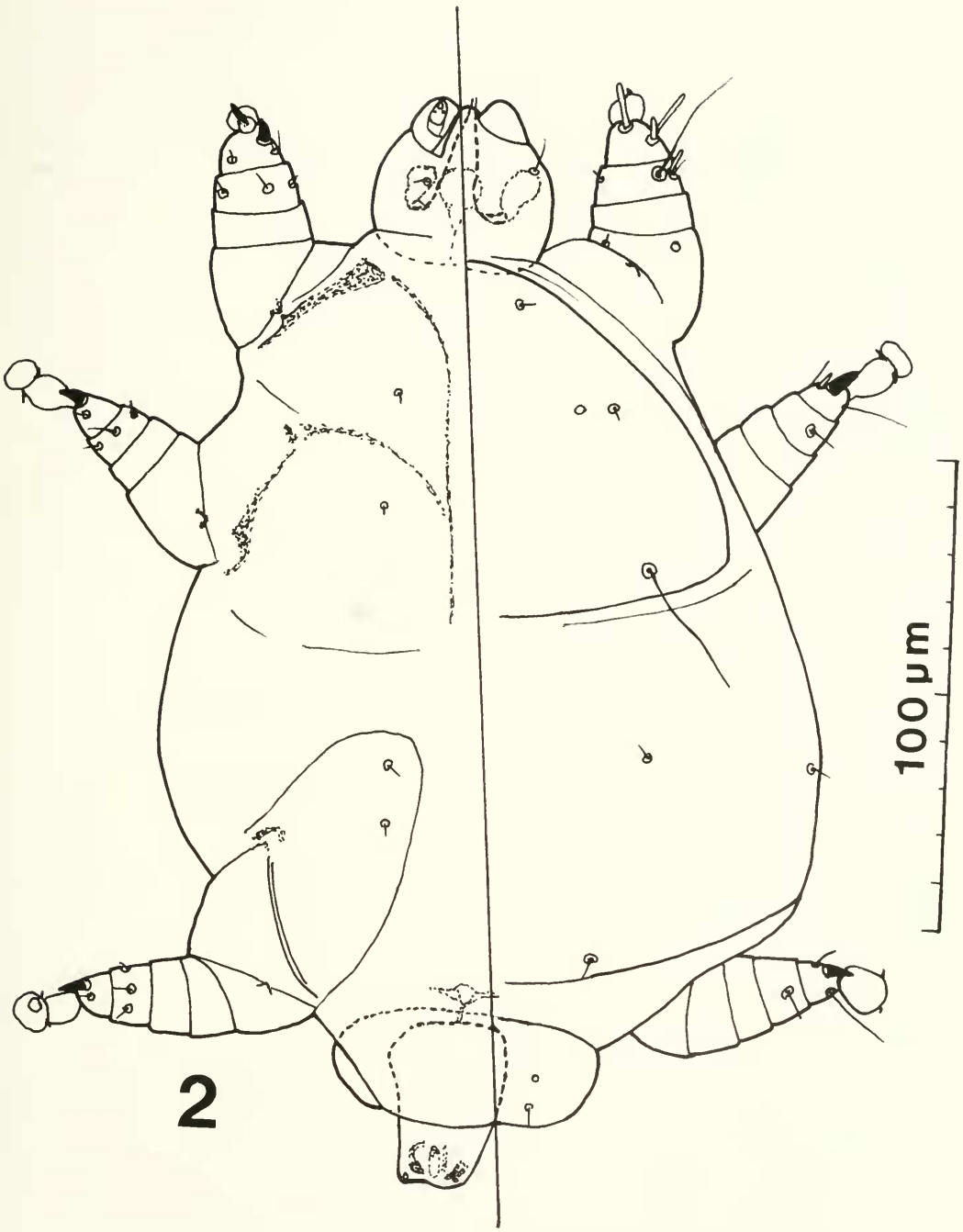

Fig. 2. *Eutarsopolipus desani* male, ventral (left) and dorsal aspects.

deme. Coxal setae 1*a* 2–3, 2*a* 2–3, 3*a* 7–8, 3*b* 7–8.

Legs: Leg setation as in Table 1. Ambulacrum I with 2 moderately developed claws, ambulacra II, III with weak claws. Tarsus I solenidion ω 3–4. Tibia I solenidion ϕ 5–6, famulus *k* 2–3. Tibiae I, II, III setae *d* 30, 8–11, 10–11 respectively.

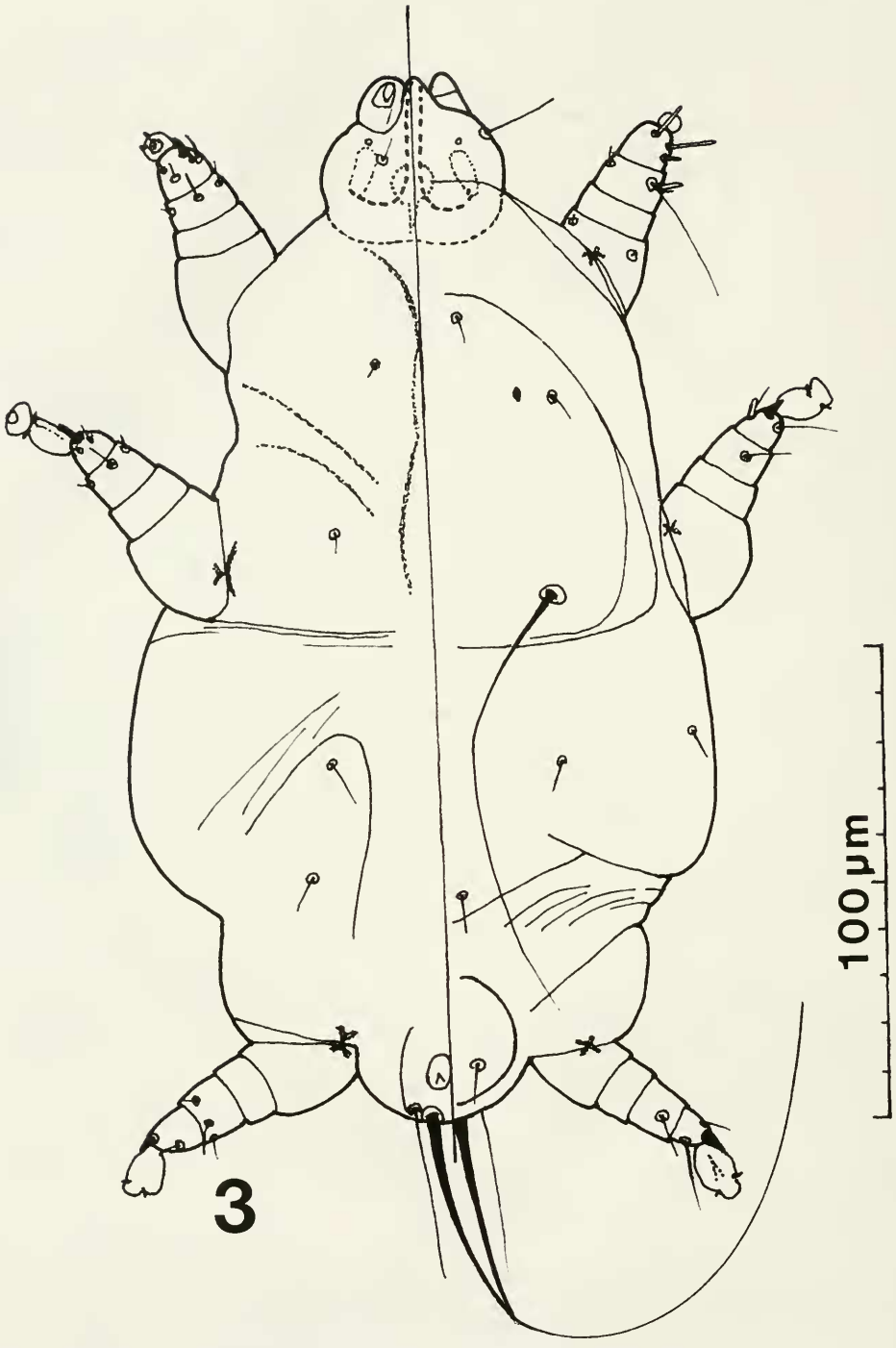

Fig. 3. *Eutarsopolipus desani* larval female, ventral (left) and dorsal apsects.

Host and locality data.—Specimens of *E. desani* were collected from *Chlaenius platynoides* from the following localities in the Democratic Republic of the Congo: Lacs Mokato, Biram-lizo, 1,880 meters, 1914, by J. Semakula; Kivu Contref., S. du Kahuzi, 2,800 meters, (for. bambous), 26–28 March 1953 by F. Basilewsky; Kivu, Mt. Kahuzi, for. bambous, 2,300 meters, 1972 by W. Paarman; Kabati, Albert Ntl. Park, 1,900 meters, 17 January 1934 by G. F. de Witte; Nya Rusambo, Albert Ntl. Park, July 1934 by G. F. De Witte.

Specimen deposition: To facilitate future studies, specimens from various localities were deposited as follows: 1 adult ♀, 1 ♂, 1 larval ♀ to the Musée Royal de l'Afrique Centrale, Tervuren, Belgium; 1 adult ♀, 1 ♂, 1 larval ♀ to The Natural History Museum, London, U.K.; 1 adult ♀, 5 ♂, 3 larval ♀ to the Acarology Collection, Adrian College, Adrian, MI, U.S.A.: 2 adult ♀, 6 ♂, 5 larval ♀ and 1 slide with 10 eggs to the Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium.

Eutarsopolipus mirifici Husband, new species

(Figs. 4–5)

Diagnosis.—*Eutarsopolipus mirifici* males resemble the male of *E. myzus* Regenfuss 1968. Two adult female type specimens of *E. myzus* exist. Regenfuss illustrated a ventral view of the male but no dimensions were published. No male or larval female specimen of *E. myzus* now exists. The genital capsules of both species are about as wide as long and slightly concave laterally. Tibia I solenidion ϕ is short in male *E. mirifici*. Cheliceral stylets of male *E. mirifici* are 23 in contrast to 36 recorded for *E. myzus* by Regenfuss (1968). Cheliceral styets of female *E. mirifici* are 48–49 in contrast to 37–40 for *E. myzus*, femur setae *l'* are longer (16 in contrast to 13), tibia II setae *v'* are longer (15 in contrast to 8). Female *E. mirifici* are elongate and without idiosomal bulges characteristic of *E. myzus*.

Adult female (Fig. 4).—*Gnathosoma:* Length 62–63, width 48–75. Palp length 15–18; cheliceral stylet length 48–49, pharynx width 18, dorsal gnathosomal setae 20, ventral setae 5–7, distance between ventral setae 20–23. Stigmata and trachea conspicuous.

Idiosoma: Length 440–600, width 224–280. Setae v_1 6–8, v_2 8–9, sc_2 37–38. Distance between setae v_1 30–45, v_2 lateral to a line connecting v_1 and sc_2. Setae c_1, c_2 7–8. Plate EF length 60, width 182; setae *f* 5. Setae h_1 12.

Venter: Apodemes 1 moderately developed, meeting sternal apodeme medially; apodemes 2 extending to sternal apodeme. Coxal setae 1*a* 2, 2*a* 3, 3*a* 12, 3*b* 7.

Legs: Leg setation as in Table 1. Ambulacra I, II, III with well developed claws. Tarsus I solenidion ω 4. Tibia I solenidion ϕ 4–5, famulus *k* 3–4. Tibiae I, II, III setae *d* 25–27, 7–9, 5–9 respectively.

Male (Fig. 5).—*Gnathosoma:* Length 34–35, width 33–40. Palp length 10; cheliceral stylet length 16–17, pharynx width 8, dorsal gnathosomal setae thin 4, ventral setae m.

Idiosoma: Length 190–208, width 112–140. Setae v_1, v_2 m; sc_2 27. Setae c_1, c_2, *d* m. Plate EF length 22, width 43, setae *f* m. Genital capsule posterior, wider than long, with concave lateral margins, length 28–30, width 30–35.

Venter: Apodemes 1 moderately developed, meeting sternal apodeme medially; apodemes 2 extending to sternal apodeme. Coxal setae 1*a*, 2*a*, 3*a*, 3*b* m.

Legs: Ambulacrum I with a single moderately developed claw. Ambulacra II, III with weak claws. Tarsus I solenidion ω 3. Tibia I solenidion ϕ 3, famulus *k* 2. Tibiae I, II, III setae *d* 12, 2, 2 respectively.

Larval female.—Relatively few measurements were possible from larval females, all of which were removed from eggs. *Gnathosoma:* Length 26, width 31. Palp length 8; cheliceral stylet length 23, pharynx width 10, dorsal gnathosomal setae 12.

Idiosoma: Length about 150, width

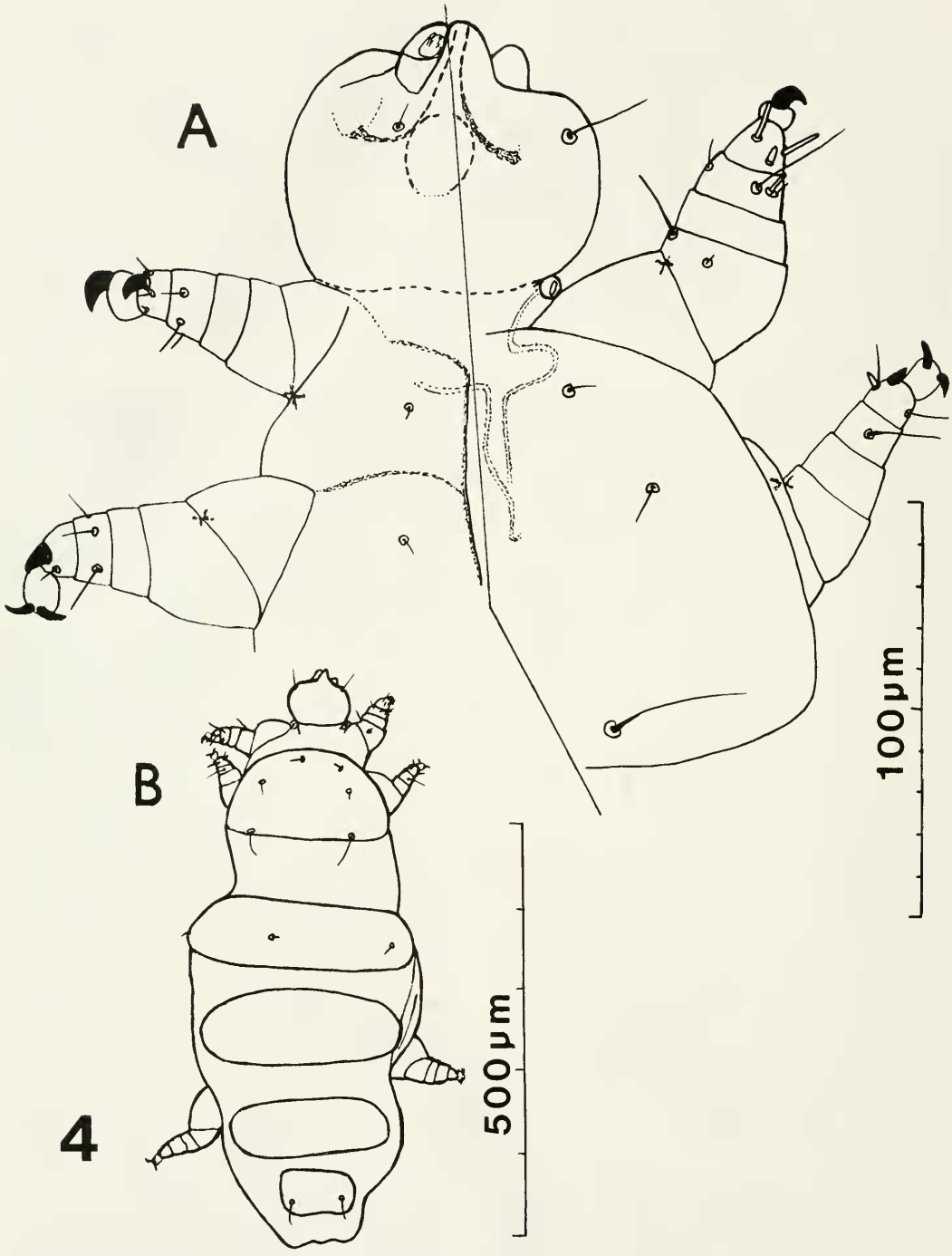

Fig. 4. *Eutarsopolipus mirifici*. A, Adult female gnathosoma/propodosoma, ventral (left) and dorsal aspects. B, Adult female, dorsal aspect.

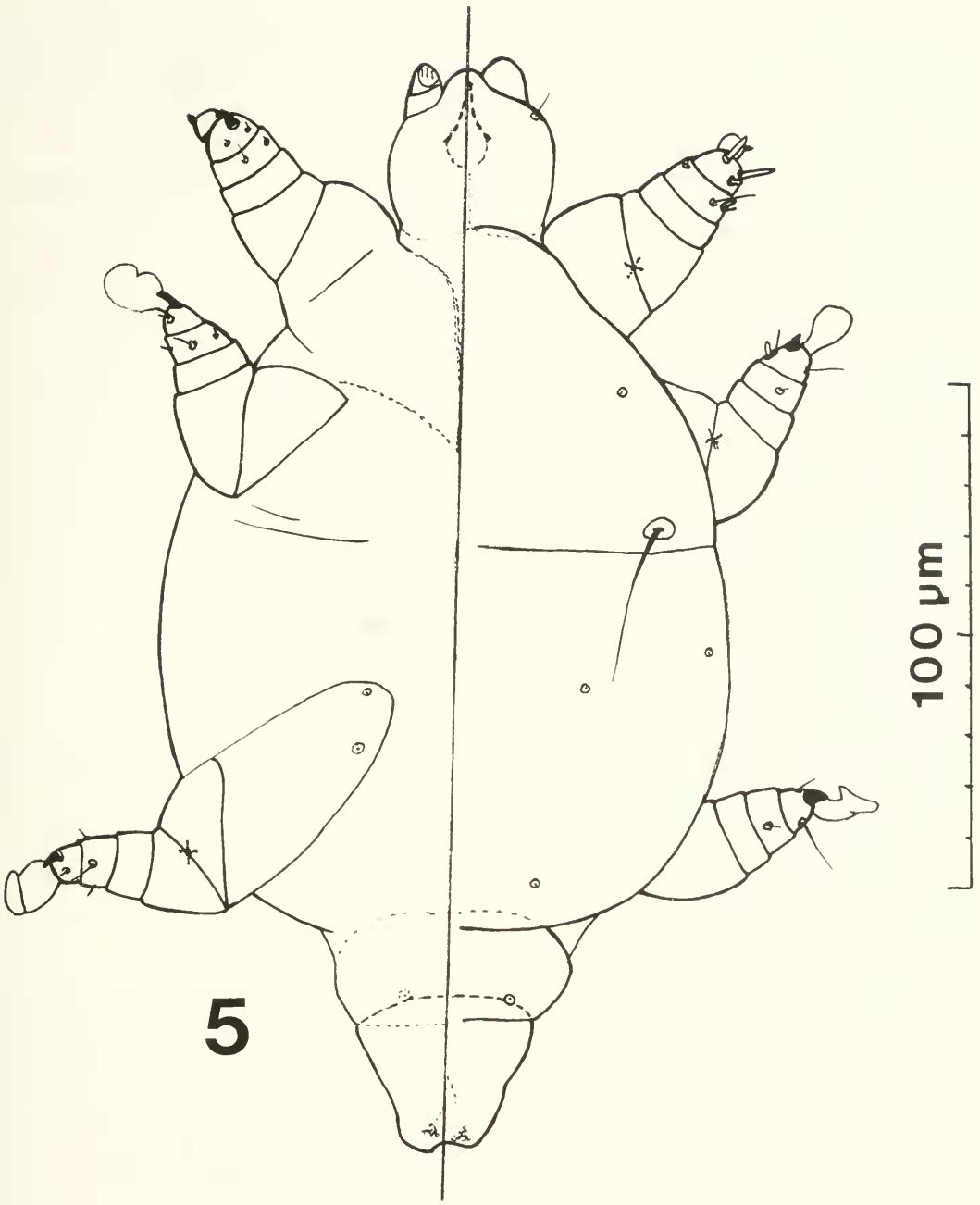

Fig. 5. *Eutarsopolipus mirifici* male, ventral (left) and dorsal aspects.

about 120. Setae v_1 6, v_2 5, sc_2 70. Setae c_1 7, setae c_2 8, setae f 7. Setae h_1 very long, setae h_2 at least 18.

Type host and locality data.—Holotype ♀, allotype ♂ and 16 paratypes: from Entebbe, Uganda, under the elytra of *Chlaenius mirificus* Pomeroy (Coleoptera: Carabidae), Sept. 1912, collected by C. A. Wiggins.

Type deposition.—Holotype, allotype and

one larval female paratype deposited in The Natural History Museum, London, U.K. (RWH10298-11); one male and one female paratypes deposited in the Acarology Collection, Adrian College, Adrian, MI, U.S.A.; one male and one larval female deposited in the Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium: one male and one embryo to the Musée Royal de l'Afrique, Tervuren, Belgium.

Etymology.—The species is named for the host, *Chlaenius mirificus* (Coleoptera: Carabidae).

Discussion

Fusion of tibiotarsus I is the only apomorphic character used by Regenfuss (1968) in placing the *desani* group as one of 2 most primitive of 7 groups of *Eutarsopolipus*. The characters represented by question marks by Regenfuss are: adult female epimere III evident or lacking, adult female genu III with a small seta or not and trochanter I with a flap or not. A character not judged to be apomorphic or plesiomorphic but also unknown by Regenfuss was if setae h_1 of larval female are widely separated or not.

Epimere III is evident and genu III setae are not present in adult female *E. desani*. Setae h_1 of larval females are not widely separated nor are flaps present on trochanter I. The existence of few apomorphic characters indicate that the *desani* group may not be among the most primitive of groups of *Eutarsopolipus*.

The *lagenaeformis* group fits into a complex of *desani, pterostichi* and *myzus* groups separated from *biunguis, acanthomus* and *stammeri* groups as illustrated by Regenfuss (1968) and separated from the more primitive *ochoai* group based on *E. ochoai* Husband 1995. Comparisons of setal patterns are presented in Table 1. *Eutarsopolipus pungens* Husband and Dastych 1998 is included in Table 2. *Eutarsopolipus pungens* is a member of the *desani* group which has males with genital capsules with straight lateral margins.

Table 2. Comparison of selected maximum measurements for *Eutarsopolipus desani* and *E. pungens* Husband and Dastych (*desani* group), *E. mirifici*, and *E. myzus* (*myzus* group) of *Eutarsopolipus*. All measurements are in micrometers, unk. = unknown.

Character	*E. desani*	*E. pungens*	*E. mirifici*	*E. myzus*
ADULT FEMALES				
Idiosomal length	600	1100	600	480
Idiosomal width	370	910	280	530
Cheliceral stylets	60	138	49	40
Pharynx width	19	28	18	22
Setae h_1	40	30	12	10
Coxal seta 3*a*	12	10	12	12
Femur I *l′*	10	21	16	13
Tibia II *v′*	16	20	15	8
Tibia II *d*	15	12	9	10
MALES				
Idiosomal length	200	278	208	no
Idiosomal width	142	248	140	male
Cheliceral stylets	33	42	33	
Dors. gnath. setae	10	13	4	
Setae sc_2	40	90	27	
Tibia II *d*	5	10	2	
Genit. cap. length	34	51	30	
Genit. cap. width	23	44	35	
LARVAL FEMALES				
Idiosomal length	270	263	150	220
Idiosomal width	208	222	120	150
Cheliceral stylets	40	68	23	36
Plate EF setae *f*	9	12	5	unk.
Coxal seta 3*a*	8	11	unk.	unk.
Tibia II *v′*	9	17	unk.	unk.
Tibia III *v′*	8	17	unk.	unk.

The *lagenaeformis, desani, pterostichi* and *myzus* groups are currently being studied to more precisely assess relationships. Most of the species in these groups have similar setal patterns but inconsistencies require additional consideration.

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the loan of *Chlaenius platynoides* and *Chlaenius* spp. (Carabidae) from the Central African Region.

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